



## **2024 Parion Underwater Research: An Evaluation in The Light of New Findings**

2024 Yılı Parion Sualtı Araştırmaları: Yeni Verilerin  
Işığında Bir Değerlendirme

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## 2024 PARION UNDERWATER RESEARCH: AN EVALUATION IN THE LIGHT OF NEW FINDINGS

### ABSTRACT

Parion is located on the Anatolian coast of the Çanakkale Strait, within the boundaries of Kemer Village in the Biga District, extending towards the Sea of Marmara. The settlement pattern of the city, shaped by the unique topography and natural coves of Bodrum Cape, represents a significant example of port infrastructure among the coastal cities of Antiquity. This research aims to document and evaluate the current state of the region's cultural heritage by examining the harbor areas of Parion and associated coastal structures using RTK- and GIS-supported positioning systems, 3D modeling, and systematic intensive underwater surveys. Due to its strategic location between the Hellespontos (Çanakkale Strait) and Propontis (Sea of Marmara), Parion's critical role in trade, economy, and cultural interactions throughout Antiquity is extensively examined. The study evaluates the remains of port-related structures, such as breakwaters, quays, seawalls and shipsheds, alongside the impact of fluvial sediments transported by the Kemer Stream on the morphological changes in the harbor area, which affected the functionality of the port. Through these findings, the research provides original contributions to underwater archaeological literature concerning the maritime activities and port infrastructure of Parion during Antiquity. Fieldwork involved systematic intensive surveys conducted with scuba equipment in three designated areas using the gridded survey method. The data obtained with RTK satellite-based positioning systems and Geographic Information Systems (GIS) provided verifiable information regarding the location of port structures, construction techniques, and patterns of usage continuity. Consequently, the archaeological potential of the Parion harbor area has been revealed in detail, and significant data have been acquired for the preservation of underwater cultural heritage. This study highlights Parion's crucial role in maritime trade and fishing activities within the Propontis and Hellespontos trade networks, offering new perspectives for comparative analyses with ancient port cities in the Mediterranean basin.

**Keywords:** Parion, Harbor, Propontis, Hellespontos, Underwater Research.



## 2024 YILI PARİON SUALTI ARAŞTIRMALARI: YENİ VERİLERİN İŞİĞİNDA BİR DEĞERLENDİRME

### ÖZ

Parion, günümüzde Çanakkale Boğazı'nın Anadolu yakasında, Marmara Denizi'ne uzanan Biga ilçesi Kemer Köyü sınırlarında yer almaktadır. Kentin, doğu-batı yönünde uzanan Bodrum Burnu'nun özgün topoğrafik yapısı ve doğal koyları, antik dönemin kıyı kentleri arasında liman altyapısı açısından önemli bir örnek teşkil etmektedir. Bu araştırma, Parion'un liman sahaları ve ilişkili kıyı yapılarını, RTK, GIS destekli konumlandırma sistemleri, 3B modelleme ve yoğunlaştırılmış sualtı taramaları aracılığıyla inceleyerek, bölgedeki kültürel mirasın mevcut durumunu belgelemeyi ve değerlendirmeyi amaçlamaktadır. Hellespontos (Çanakkale Boğazı) ile Propontis (Marmara Denizi) arasındaki stratejik konumu nedeniyle Parion'un, Antik Çağ boyunca ticaret, ekonomi ve kültürel etkileşimlerdeki kritik rolü irdelenmiştir. Araştırmada, mendirek, rıhtım, dalgakıran ve tersane gibi liman yapılarının kalıntıları ile Kemer Çayı'nın taşıdığı alüvyonların liman alanında yarattığı morfolojik değişimlerin liman işlevselliğine etkileri değerlendirilmiş; bu bulgular aracılığıyla Parion'un denizcilik faaliyetleri ve liman altyapısının Antik Çağ'daki kullanımına ilişkin arkeolojik sualtı literatürüne özgün katkılar sunulmuştur. Saha araştırmalarında, alan kapama yöntemi kullanılarak belirlenen üç bölgede scuba ekipmanı ile yoğunlaştırılmış taramalar gerçekleştirilmiştir. RTK uydu tabanlı konumlandırma sistemleri ve coğrafi bilgi sistemleri (GIS) desteğiyle elde edilen veriler, liman yapılarının konumu, inşaa teknikleri ve dönemsel kullanım sürekliliği hakkında doğrulanabilir bilgiler sağlamıştır. Araştırma sonucunda, Parion liman bölgesinin arkeolojik potansiyeli detaylı biçimde ortaya konmuş ve sualtı kültürel mirasının korunması için önemli veriler elde edilmiştir. Bu çalışma, Parion'un Propontis ve Hellespontos ticaret ağlarındaki deniz ticareti ve balıkçılık faaliyetlerindeki önemli rolünü, arkeolojik sualtı bulguları ışığında ortaya koymakta ve Akdeniz havzasındaki antik liman kentleriyle karşılaştırmalı analizler için yeni perspektifler sunmaktadır.

**Anahtar Kelimeler:** Parion, Liman, Propontis, Hellespontos, Sualtı Araştırmaları.



## INTRODUCTION

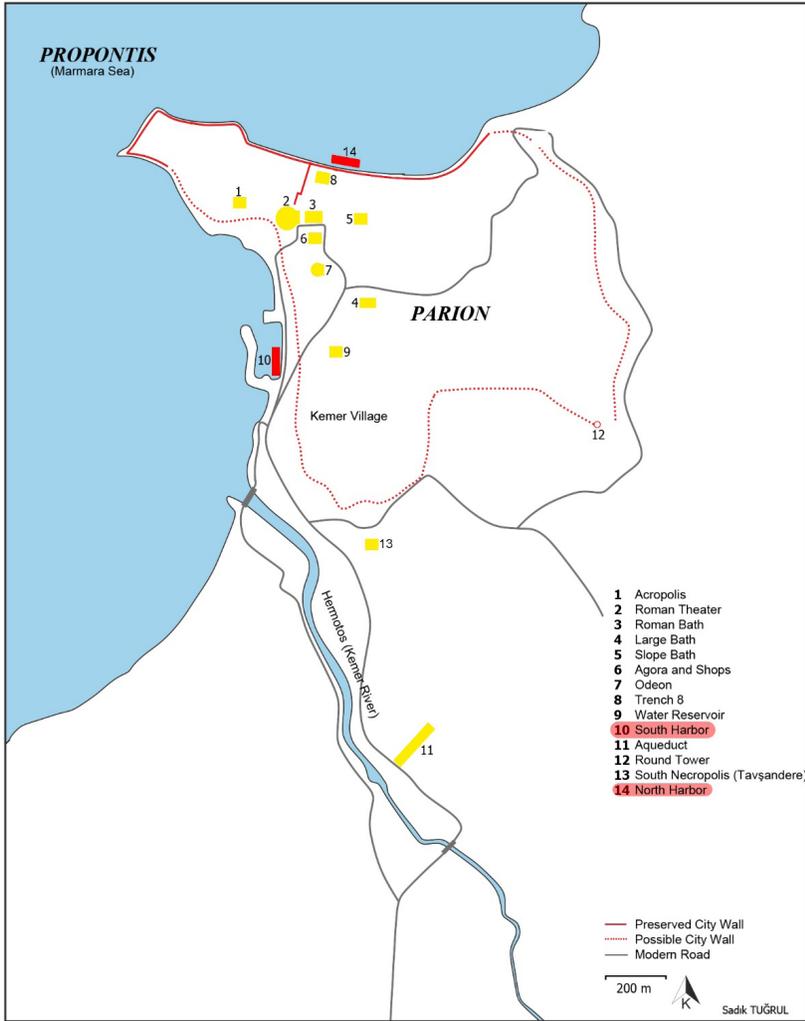
Parion<sup>1</sup>, located within the boundaries of Kemer Village in the Biga District of Çanakkale Province, has a settlement pattern shaped by the unique topography and natural coves of Bodrum Cape, extending in an east-west direction (Fig. 1, 2). The city's structure represents a significant example of port infrastructure among coastal settlements of Antiquity. In the 2024 excavation season, underwater research was conducted as part of the Parion Excavation Directorate's program using scuba equipment and the systematic intensive survey method. This study aims to document and evaluate cultural remains through underwater research focused on Parion's harbor areas and associated coastal structures by employing advanced technologies such as RTK- and GIS-supported positioning systems, 3D modeling, and systematic intensive underwater surveys. Due to its strategic position between Hellepontos (Çanakkale Strait) and Propontis (Sea of Marmara), Parion's critical role in trade, maritime networks, and cultural interactions throughout Antiquity is extensively examined<sup>2</sup>.



**Fig. 1.** The Location of Parion within the Troas Region (Map by S. Tuğrul).

<sup>1</sup> For a general bibliography on the city, see Smith 1854, 550; Schliemann 1881, 183; Leaf 1923, 83; Magie 1950, 19, 326, 614; Ramsay 1960, 173; Hammond - Scullard 1970, 782; Jones 1971, 86; Boardman - Hammond 1982, 119; Frisch 1983, 60; Başaran 1999, 350; Avram 2004, 991; Başaran - Tavukçu 2007, 623; Başaran 2008, 134; Prêteux 2009, 335, n.1; Keleş 2011, 241; Gündüz 2021; Yılmaz - Yılmaz 2023; For ancient sources on the city, see Aen. Tact. I, 1-3; Hdt. IV, 137-140; V, 117; Paus. IX, 27; Strab. X, V, 7; XIII, I, 13; XIII, I, 14.

<sup>2</sup> Gündüz 2021, 635-636.



**Fig. 2.** Urban Plan of Parion: Potential South and North Harbors with Key Structures (Plan by S. Tuğrul).

Although various studies have directly or indirectly addressed Parion's harbors, these works primarily rely on predictions and topographical analyses<sup>3</sup>. Mostly based on terrestrial observations and theoretical assumptions, such studies are limited by the lack of field data. Therefore, this research, which is based on field data related to Parion's underwater architecture and maritime infrastructure, holds critical importance in filling the gap in the existing literature. During the planning phase

<sup>3</sup> Durdağı 2004, 34-42; Erginala et al. 2013, 174-175; Ergürer - Genç 2013, 43-56.

of the research, three main areas were designated according to the study objectives, and the gridded survey method was applied (Fig. 3). Systematic intensive surveys using scuba equipment were carried out in a corridor approximately 40 meters wide, extending from the shoreline around Bodrum Cape, at depths ranging from 1 to 15 meters. In addition, coastal surveys were conducted to identify architectural remains potentially belonging to structure groups such as breakwaters, quays, and seawalls. Numerous architectural elements were identified between 1 and 3 meters deep within a zone extending up to approximately 15 meters from the shoreline.



Fig. 3. Underwater Survey Areas (Parion Archive).

Advanced technologies were employed to position and digitally record the identified remains. RTK (Real-Time Kinematic) satellite-based positioning systems, Total Station equipment, and Geographic Information Systems (GIS) were used for the high-precision collection of field data, digital mapping, and 3D modeling processes<sup>4</sup>. In this context, two fixed points were defined for the Total Station setup: a station reference point and a control point. The coordinates of these points were calculated using a single-frequency RTK satellite-based positioning device with eight hours of continuous measurement. The data obtained provided direct and verifiable information about the location of port structures, construction techniques, and patterns of usage continuity, establishing a solid foundation for future research. Throughout the research process, extensive interviews were conducted

<sup>4</sup> The use of Geographic Information Systems (GIS) and three-dimensional (3D) modeling techniques plays a critical role in the collection, analysis, and interpretation of spatial data in archaeological research, including underwater archaeology. Breman 2003, 25-32; Benjamin et al. 2019, 211-231; Landeschi 2019, 17-32.

with local stakeholders to benefit from local knowledge. Information obtained from local fishermen, sponge divers, and amateur divers provided complementary data on the potential locations of underwater structures, wreck sites, and exploration areas, offering qualified findings that will guide future research.

In this context, this study not only provides comprehensive field data on Parion's underwater cultural heritage but also aims to deliver original, systematic, and data-driven insights into Parion's maritime heritage, trade routes, and the functions of port structures by supporting the assumptions of previous studies with concrete data through methodological innovations and the effective use of technological tools.

### MODERN FISHING SHELTER AND ITS SURROUNDINGS

The modern fishing shelter is located north of Kemer Village, southwest of the Parion city center, at the point where an elevation parallel to the coastline meets the sea. Today, this area is used for fishing activities and as a slipway and fishing shelter, highlighting the continuity of maritime activities in the region (Fig. 4). Although the modern fishing shelter has undergone changes due to anthropogenic interventions and natural processes, it still holds potential for offering clues about the region's past maritime infrastructure. As part of the underwater research, dives were conducted using the systematic intensive survey method, and the designated areas were examined in detail through the gridded survey method. The studies suggested that the breakwater of the modern fishing shelter might have been built upon or elevated over an ancient breakwater; however, no direct evidence of an ancient breakwater was identified.



**Fig. 4.** The Modern Fishing Shelter and the Ancient Breakwater (Parion Archive).

Dives carried out in the fishing shelter area revealed dense ceramic remains at a depth of approximately 4 meters. Among these, a considerable number of ceramic fragments believed to belong to the Ottoman period were documented (Fig. 5). Notably, the concentration of ceramics in the area locally referred to as the “Ottoman Harbor” demonstrates the importance of the relationship between oral traditions and archaeological findings. The density of ceramics dating to the Ottoman period indicates that this area was actively used as a maritime and trade hub at the time.



Fig. 5. Ottoman Period Ceramics (Parion Archive)

In studies conducted south of the modern fishing shelter, at the point where Kemer Stream (Hermotos) flows into the sea, surveys were carried out using the gridded survey method at depths ranging from 1 to 12 meters along the coastline. It was observed that alluvial deposits carried by the Kemer Stream covered the entire seabed, making it difficult to detect possible archaeological remains in the area. Nevertheless, some isolated stone blocks and largely deformed ceramic fragments, possibly dating to the Late Antiquity period, were identified. These findings provide significant insights into the usage of the area during Antiquity and the natural processes it underwent over time. It is assessed that the ponds located in the region where Kemer Stream flows into the sea, known to have been filled later by the local population, may have formed as a result of the accumulation of alluvial deposits transported by the stream over historical periods<sup>5</sup>. This process may have led to the silting of a natural inlet and morphological changes in areas that could have

<sup>5</sup> Tuğrul 2024, 14.

functioned as potential harbors. Moreover, the abandonment of a potential harbor or fishing shelter in the region may be associated with tectonic activities triggered by earthquakes, coastal line shifts, and related geomorphological changes during historical periods<sup>6</sup>. Earthquakes cause damage to coastal structures and interrupt usage continuity and can be considered a significant factor in the evolution of underwater architecture and coastal connections. However, comprehensive underwater archaeological research based on geomorphological, sedimentological, and geophysical analyses are required to confirm these hypotheses. Within the scope of our research program, field studies planned for the coming years will enable more precise assessments regarding the identification of potential harbor structures in the area, their usage continuity, and the impact of natural processes.

### SOUTH OF THE ANCIENT BREAKWATER AND THE MODERN FISHING SHELTER ENTRANCE

The structure composed of stone remains located south of Bodrum Cape, referred to locally as the “döküntü” (debris), extends in a north-south orientation and appears to function as a breakwater (Fig. 6). Positioned strategically to protect a natural bay from strong winds, this structure may have played a significant role in supporting harbor activities in the region. An examination of its architectural features revealed a configuration consisting of large stone blocks placed on top of each other. A dense layer of marine vegetation covering the stone surfaces complicates detailed analysis but simultaneously indicates a prolonged period of use (Fig. 7).



**Fig. 6.** The Ancient Breakwater of the Southern Harbor (Parion Archive).

<sup>6</sup> Perinçek - Kozanlı2022; Doğançcı 2018; Doğançcı 2019.



**Fig. 7.** Stones Comprising the Ancient Breakwater (Parion Archive).

During the two-phase diving survey, no architectural remains directly related to the ancient harbor were detected inside the breakwater. However, ceramic fragments from different periods and wooden remains were identified at the entrance of the modern harbor at a depth of approximately six meters. These findings point to the periodic use of the harbor and its transformations over time.

Preliminary evaluations suggest that the “döküntü” structure may have functioned as a breakwater. Such structures were widely employed in ancient harbors to dissipate wave energy and provide sheltered waters within the harbor basin<sup>7</sup>. Breakwaters were typically constructed with smaller stones forming the core, medium-sized stones in the filter layer, and large stone blocks in the armor layer. The north-south orientation of the structure suggests a deliberate design aimed at controlling maritime traffic and ensuring harbor safety.

However, there is currently no definitive evidence confirming that this structure functioned as a rubble mound breakwater. Although preliminary investigations indicate such a role, a comprehensive understanding of its historical usage and construction techniques requires extensive underwater archaeological research. This includes geomorphological and geophysical analyses, along with the removal of the dense marine vegetation covering the stone surfaces,

<sup>7</sup> De Graauw 2022, 25-30.

which will enable a detailed examination of the structure's architectural characteristics and contribute to more conclusive interpretations regarding its function and continuity of use.

Similar structures have been identified in ancient harbors along the coasts of the Eastern Mediterranean, the Aegean Sea, and the Black Sea, particularly in sites such as Salih Island<sup>8</sup>, Knidos<sup>9</sup>, Liman Tepe (Klazomenai)<sup>10</sup>, Phaselis<sup>11</sup>, and Tieveion<sup>12</sup>. These examples demonstrate functional similarities between the "döküntü" structure in Parion and breakwater constructions that played crucial roles in ancient maritime activities.

Nevertheless, to confirm the functional characteristics of the structure, future underwater archaeological investigations supported by geomorphological and geophysical analyses should be carried out following the removal of dense marine vegetation to allow for precise architectural documentation.

## THE STONE TOWER AND THE ANCIENT NORTHERN HARBOR AREA

The Northern Harbor is located in the area where a structure referred to as the "Taş Kule" (Stone Tower) stands to the north of the city's Roman Bath and Roman Theater (Fig. 8). Ancient wall remains, partially submerged at the intersection of land and sea along a northeast-southwest axis, were identified during the underwater survey. Additionally, a significant number of stone blocks were observed in the surrounding area. These blocks may have reached their current positions not only through wave action but also because of human transportation at different periods. It is well known that blocks from various structures in the city were transported both by land and sea for reuse in different locations<sup>13</sup>. Furthermore, earthquakes, natural processes, and human-induced interventions in the region played a crucial role in the destruction of structures and contributed to the distribution of stone blocks in the area.

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<sup>8</sup> Dumankaya 2015, 48.

<sup>9</sup> Aslan 2019, 241-243, Fig. 3.

<sup>10</sup> Tuğcu 2017, 88, Fig. 3.

<sup>11</sup> Blackman 1973, 358, 359, Fig. 7, 8.

<sup>12</sup> Yıldırım 2021, 472.

<sup>13</sup> Robert 1950, 83, 86.



**Fig. 8.** Breakwater Remains and Beachrock of the Northern Harbor (Parion Archive).

The construction of the mole exhibits a system in which the stone blocks were asymmetrically cut and interlocked naturally, ensuring high structural resilience against wave impact, particularly from the North (Fig. 9). A similar masonry technique is observed in the mole blocks of the Kalpe Harbor<sup>14</sup>, providing an important comparative framework for understanding ancient harbor engineering practices.



**Fig. 9.** Masonry Structure of the Northern Harbor Mole (Parion Archive).

<sup>14</sup> Aslan 2014, 133, 134.

Significant findings were obtained during the research conducted around the Northern Harbor. Approximately 20 meters from the Taş Kule, at a depth of 2 meters, fragments of a column shaft were identified. However, due to a thick layer of marine vegetation covering its surface, documentation was limited to photography (Fig. 10).



**Fig. 10.** A Column Fragment Documented Underwater (Parion Archive).

Furthermore, georadar surveys conducted in Parion have revealed the presence of a rectangular-plan structure near the coastline, immediately south of the Northern Harbor<sup>15</sup>. The layout and location of this structure suggest that it may have functioned as a harbor agora or a public building supporting commercial activities. The previously mentioned Taş Kule held strategic importance in terms of military surveillance and harbor control<sup>16</sup>. The functional connection between these two structures suggests an organized system for regulating harbor operations and monitoring maritime trade. However, targeted archaeological excavations, geomorphological analyses, and detailed architectural documentation are required to substantiate this hypothesis.

<sup>15</sup> Malgıl - Yılmaz 2024, 217, Fig. 16.

<sup>16</sup> Ergürer - Genç 2013, 47-50, Fig. 18.

## EVALUATION AND CONCLUSION

The 2024 underwater research in Parion has provided new insights into the city's maritime history and, through investigations conducted in three main research areas, has revealed significant findings regarding the functions, construction techniques, and long-term usage of harbor structures. The data obtained indicate that Parion utilized various harbors for trade, defense, and military purposes throughout Antiquity. Regarding earlier periods, it is suggested that the people of Parion may have used natural waterways as ship shelters and that certain areas along the Kemer Stream (Hermotos) delta may have functioned as harbor facilities. However, alluvial deposits caused by stream flooding have covered these areas over time, making it difficult to identify architectural remains.

In the southern harbor area, known as Güney Liman, Bodrum Cape served as a natural breakwater; however, an artificial breakwater structure measuring 67x120 meters was constructed using stone blocks to provide additional protection for the harbor. This breakwater consists of collapsed and scattered stone blocks of varying sizes. Furthermore, the discovery of Ottoman-period ceramics during underwater research and the local designation of the site as "Tersane Burnu" (Shipyard Cape) suggest that the harbor remained in use from the Late Antique Period to the Ottoman era. However, modern roads covering parts of the harbor remains, and the lack of excavation opportunities limit more detailed interpretations.

In the northern coastal area, associated with the Northern Harbor (Kuzey Liman), breakwater remains have been evaluated not only as harbor infrastructure but also as an integral part of the city's defense system. The construction features of the breakwater reveal large limestone and marble blocks with precisely cut angled edges. These blocks may have been transported from the nearby island of Marmara. Additionally, the isodomic masonry and smooth-surfaced blocks, which date to the Hellenistic period, reflect the advanced construction techniques of that era. The breakwater is contemporary with the Hellenistic fortification walls, and structural evidence suggesting the presence of a chain barrier at the harbor entrance indicates its role in the city's military defense strategy.

The inhabitants of Parion are believed to have engaged in trade<sup>17</sup> and fishing<sup>18</sup>, in addition to agriculture and viticulture<sup>19</sup>. The proximity of the two harbors to the agorae and the distribution of amphora types discovered in the city confirm that products such as wine, olive oil, salted fish, and fish sauce were primarily transpor-

<sup>17</sup> Cottier et al., 2008, 34-35, no. II, 22-26.

<sup>18</sup> For the marine products consumed and supplied in Parion, see: Plin. Nat. XXXII. 53; Purcell 1995, 146-147, Fig. 10.1; Çelikbaş 2021, 409-420; Keleş - Yılmaz 2022, 538, 539, Table 1.

<sup>19</sup> Strab. Geogr. XIII.1.12.

ted via maritime trade<sup>20</sup>. The findings related to the military harbor complex, associated with the Northern Harbor, indicate that Parion was not only a commercial hub but also an important center for naval activities and coastal defense (Fig. 11). The documented podium-based stone tower, when considered alongside the parallel fortification walls along the shore, suggests a strategic function related to the harbor's defense and organization. The presence of natural beachrock formations in the area suggests that these may have served as ship ramps or facilitated maritime activities in Antiquity (Fig. 8). Radiocarbon dating from underwater samples taken from an opening in the submerged beachrock indicates that this formation occurred approximately between 837-33 BCE<sup>21</sup>. The upper layer of beachrock, closer to the shore, has been dated to approximately 1503-1693 CE<sup>22</sup>, marking the period when the structural function of the harbor or fishing shelter ceased.



**Fig. 11.** Drawing of the Breakwater Remains of the Military Harbor (İdil Malgılı).

The historical significance of Parion in terms of military strategy is consistent with the findings of this research. Particularly, during the Peloponnesian War (431-404 BCE), Parion is known to have allied with the Athenians. The research findings support the hypothesis that the harbor where Alcibiades assembled his fleet in 410 BCE was likely the Northern Harbor, due to its protective structure and considerable size<sup>23</sup>. Additionally, the disruptions in regional stability caused by the Mithridatic Wars, which significantly challenged Roman dominance in Anatolia, are well-documented. It is recorded that Mithridates VI Eupator's fleet spent a period of time in Parion<sup>24</sup>, and during this period, the harbor functioned as a military base<sup>25</sup>. These findings indicate that Parion was not merely a commercial center but also played a crucial role as a strategic military port in the geopolitical struggles of the region.

<sup>20</sup> Keleş et al., 2021, 93-95.

<sup>21</sup> The radiocarbon analysis conducted has dated the sample to approximately 2850-1980 years ago. See Erginal et al. 2013, 174, 175.

<sup>22</sup> The radiocarbon analysis conducted has dated the sample to approximately 510-320 years ago. See Erginal et al. 2013, 174, 175.

<sup>23</sup> Upon learning that the fleet of the Peloponnesian League was stationed in Cyzicus, the Athenian commander Alcibiades assembled his naval force of 86 ships in the harbor of Parion. See Xen. Hell. 1.1.13-16.

<sup>24</sup> App. Mith. 1.1.76; Magie 1950, 329.

<sup>25</sup> Palaz - Erdemir, 2004, 173; Keleş 2011, 241.

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## Conflict of Interest

Within the scope of the study, there is no personal or financial conflict of interest between the authors.

## Ethical Statement

Regarding the requirement for Ethics Committee approval, the authors and reviewers have confirmed that no such approval is necessary for this study.

## Author Contributions

Design of Study: AB(40%), STAM(30%), STUĞ(30%)

Data Acquisition: AB(40%), STAM(30%), STUĞ(30%)

Data Analysis: AB(40%), STAM(30%), STUĞ(30%)

Writing Up: AB(40%), STAM(25%), STUĞ(35%)

Submission and Revision: AB(50%), STUĞ(50%)

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